DEPARTMENT OF INDUSTRIES

BOMBAY PRESIDENCY

ANNUAL REPORT

1925-26

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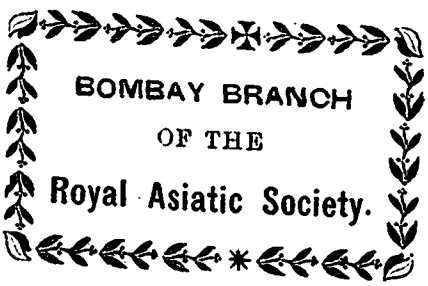

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OFFICE OF THE DIRECTOR OF INDUSTRIES,
OLD CUSTOM HOUSE:
Bombay, 3rd December 1926.

FROM

F. E. BHARUCHA, ESQ., L.M.E., M.I.M.E., M.I.E.,
Director of Industries, Bombay;

TO

THE SECRETARY TO GOVERNMENT,
General Department,
Bombay.

Subject—Annual Report, 1925-26

Sir,

I have the honour to submit the annual report of the Department of Industries for the year 1925-26 (1st August to 31st July).

POLICY

2. In accordance with the wishes of the Legislative Council, Government of Bombay were pleased to direct on 14th July 1925 that the Department of Industries should be re-organised under an Indian Director assisted later on, if necessary, by a Deputy Director and I was asked to hold the newly created appointment of the Director of Industries. The activities of the re-organised Department of Industries were defined as follows:—

(1) Supply of commercial intelligence to private enterprises.
(2) Professional or technical advice and assistance to minor industries.
(3) Demonstration in cottage industries specially in weaving.
(4) Technical Education.
(5) Experimental and demonstration work in Rosha oil and fish oil and manufacture of magnesium chloride.
(6) Fisheries (including the cultivation of oysters).

3. The Director of Industries being an ex-officio member of the Board of Trustees of the Prince of Wales Museum, I had to attend the monthly meetings of the Board of Trustees of the Museum.

STAFF

4. Although the post of the Director of Industries was re-created in July 1925 to re-organise the Department, I had only one clerk and one typist under me till December 1925, when only two additional hands were sanctioned, and three more clerks were sanctioned and added from April 1926. I had, however, no assistant or deputy director under me throughout the year under report. There are now seven clerks in Bombay Office including the head clerk.

5. There was no change in the weaving staff during the year, which consisted of four weaving assistants (inspectors of weaving schools and demonstrations), one Dyeing and Calico Printing Demonstrator and 32 weaving masters, and demonstrators all of whom worked in the mofussil.

EXPENDITURE

6. The expenditure incurred by this Department during the financial year 1925-26 and the three preceding years was as follows :—

	Rs.
1922-23	2,39,000
1923-24	1,37,885
1924-25	65,800
1925-26	67,457

7. The expenditure incurred by other departments on account of Technical Scholarships and Pottery Demonstration Factory at Sir J. J. School of Art is not included in the figures for 1924-25 as these items were under the control of other departments though the provision for the same was made in the budget of this Department. Since the re-organisation of this Department the subject of Technical Education has been allotted to this Department, and the expenditure incurred on Technical Scholarships has therefore been included in this year's figures.

TECHNICAL ADVICE AND HELP

8. During the year under report, I visited a number of industrial factories to give technical advice and help and to discuss various problems pertaining to industrial organisation, defects in power plant and machinery, markets for raw material and finished products, reduction in cost of working charges, labour saving appliances and other similar engineering, technical and industrial subjects.

9. Besides these visits to factories, a list of which is given below, I gave technical advice by correspondence to various industrialists inquiring from all parts of the Presidency and to a large number of visitors who called on me personally either in my office at Bombay or when I was in camp

on tour. The Industrial School at Ratnagiri consulted me by correspondence on various points regarding the lay-out and equipment of its new workshop, and all the equipment required by the School was made to my specification and supplied under the supervision of this Department from Messrs. Vithal Purshottam & Co., Bombay. I was often asked by visitors to accompany them to the offices and show rooms of machinery dealers to help them in selecting machinery and power plants for their industrial concerns.

10. A scheme for opening a Technical School in Bombay to be maintained by the Municipal Corporation from a donation offered by Sir Currimbhai Ebrahim was submitted to this Department by the Schools Committee of the Corporation for opinion and it was fully criticised and reported upon, with useful suggestions.

LIST OF INDUSTRIAL CONCERNS VISITED DURING THE YEAR

11. Framroz Brush and Cabinet Factory, Bombay.
Dr. J. D. Writer's Tikli Factory, Bombay.
Ogale Glass Works, Karad.
Godrej Toilet Soap Factory, Bombay.
Godrej Oil Mill and Bar Soap Factory, Bombay.
Bharat Knitting and Hosiery Works, Poona.
Santa Cruz Match Factory.
Kolaba Press Factory, Gadag.
Electric Power House, Gadag.
Mahaluxmi Gin and Press Factory, Gadag.
Manvi Gin Factory, Gadag.
Central Distillery, Nasik.
Framjee Petit Mills, Bombay.
Karachi Roller Flour Mill, Karachi.
Sindh Patent Tile Works, Karachi.
Sindh Flour Mill, Karachi.
Khimchand Jeram Oil Mill, Karachi.
India Flour Mill, Karachi.
Crystal Ice Factory and Cold Storage, Karachi.
Brick and Tile Factory, Budhapur.
Karachi Saw Mills, Karachi.
Dhanbhura Oil Mill and Weaving Factory, Bulsar.
Shaparia Iron Works, Bombay.
Vithal Purshottam Iron Works, Bombay.
Haldankar Nib Factory, Malwan.
Rani Nib Factory, Malwan.

Borivli Match Factory, Borivli.
Asada Match Factory, Kurla.
K. D. Rane's Paint and Varnish Works, Khar.
National Industrial Works, Bombay.
Katrak Hosiery Works, Bombay.
Topiwala Metal Works, Bombay.
S. Sulemanji Tin Can and Drum Factory, Bombay.
Acme Manufacturing Co.'s Metal Works, Bombay.
Seva Sadan Industrial Home, Bombay.
Lokmanya Mills, Barsi.
Jaishankar Mills, Barsi.
Jam Mills, Sholapur.
Umedpur Industrial Settlement, Sholapur.
Kalianpur Industrial Settlement, Sholapur.
New Prince of Wales Gin and Press Factory, Bijapur.
Harvey and Sabhapati Gin and Press Factory, Bijapur.
Mahaluxmi Oil Mill and Paint Works, Bijapur.
Chikhli Gin Factory, Chikhli.
Polson's Coffee and Butter Factory, Bombay.
Britannia Biscuit Factory, Bombay.
National Glass Works, Bombay.
H. Ismailjee Iron Works, Bombay.
Western India Confectionery Works, Bombay.
Mahaluxmi Oil Mills, Bombay.
Padamjee Paper Mills, Bombay.
Padamjee Soap and Ink Factory, Bombay.
T. E. Tajbhai Iron Works, Bombay.
Ramrao Gaikwad Weaving Factory, Sholapur.
Bhagirthi Oil Mill, Bombay.
Paisa Fund Glass Works, Talegaon.

TOURING

12. In the absence of any responsible and qualified technical assistant under me who could look after office work and attend visitors in my absence, I could not do much touring during the year. However, I was on tour for 79 days during the year and my tour included the following places :—

Karad, Surat, Belgaum, Gadag, Nasik, Bulsar, Malwan, Malegaon, Barsi, Bijapur, Chikhli, Sholapur, Kurla, Borivli, Poona, Talegaon, Karachi, Budhapur (Sindh).

13. I toured in Sindh during the X'mas holidays and my visits to Poona were in connection with the Agricultural Show.

INSPECTION AND INVESTIGATION ON BEHALF OF STORES PURCHASE DEPARTMENTS

14. Workshops, showrooms, shops and godowns of 15 firms in Bombay, who had applied for registering their names as approved contractors, were inspected by me during the year on behalf of the Stores Purchase Department of the Government of United Provinces and the Indian Stores Department of Government of India, to whom reports were submitted.

COMMERCIAL AND INDUSTRIAL INTELLIGENCE

15. A complete list of enquiries received during the year is given in the Appendix at the end of this report and shows their general nature and magnitude of the work done in digging out the information required from various sources and supplying the same to enquirers with the help of a small clerical staff under me. This is the most popular section of this department, and, in spite of the general depression in the trade, people did not fail to avail themselves of the services that this department could render in supplying information on wide and varied commercial and industrial subjects as well as in engineering and technical matters.

16. In addition to the enquiries enumerated in the Appendix, as many as 152 enquiries on other miscellaneous subjects were received and disposed of which cannot be strictly classed with commercial or industrial ones.

17. As a general rule enquiries from overseas firms for trade connections with Bombay merchants were passed on to His Majesty's Trade Commissioner and those from Indian merchants for trade connections with foreign countries were passed on to the Director General of Commercial Intelligence and Statistics, Calcutta. Enquiries from other provinces of this country are not dealt with by this department directly unless they come through the Directors of Industries of those provinces.

DEVELOPMENT OF INDUSTRIES

18. The unusual trade depression continued throughout the year and although the prices of machinery were very low no new large industrial concerns seem to have been projected in this Presidency during the year, except some small factories such as cotton ginning factories, oil mills, etc.

19. During my visit to Karachi in December last I interviewed some prominent persons of that city who were very anxious to start a cotton spinning and weaving mill at Karachi, and gave them all necessary information and preliminary advice as regards the selection of site and

general organisation for floating a limited liability company for the purpose ; but owing to the nervousness of some of the capitalists the project did not fructify. The potential capital in Karachi is great but nervousness and lack of confidence comes in the way of its investment in industries. The present slump in the textile industry in this Presidency is also responsible to some extent for the failure of the project.

20. Karachi is going to develop itself into a large and important cotton market in the near future. Cotton ginning and pressing factories are now rapidly increasing in Sindh as well as in the Punjab, the cotton from which is now transported to Karachi harbour to be shipped to other ports and foreign countries. The population of Karachi is increasing by leaps and bounds and is now more than 200,000. The Lloyd Barrage and its net work of canals in Sindh will stimulate growing of long staple cotton, and trade with the Persian Gulf in cloth and yarn is growing and is bound to expand in the near future for which new shipping wharves are now extensively being built by the Karachi Port Trust. With all these facilities for trade and raw material at its door Karachi offers a very unique opportunity for starting and developing textile industry, and it is now for Karachi capitalists and industrialists to come forward to seize the opportunity.

21. There is another good field for developing industries at Karachi and that is fishery. Makran Coast in Sindh is said to be heavily fish-laden and offers an opportunity for developing fishery on the most modern lines. This vast source of wealth has been almost entirely neglected except some trade in shark fins, fish bladders, maws, livers, etc., which is still carried on on a small scale. It is said that there is more fish around Karachi and Makran Coast line than around Bombay coast line, and with modern scientific methods of catching, preserving and marketting fish, this enormous source of wealth of sea at our own door could easily and successfully be tapped if sufficient capital and enterprise are brought to bear on the problem.

COTTON MILLS

22. Notwithstanding the abolition of the cotton excise duty, the condition of the textile industry did not show any sign of improvement throughout the year. The removal of the excise duty eased the situation slightly but did not mend matters. Out of four new cotton spinning and weaving mills projected at Barsi only two—the Lokamanya and the Jaishankar—have been constructed but not started as yet, as the building construction of the former and the erection of machinery of the latter are not complete. The project of a new mill at Sholapur fell through as the municipal authorities of that place could not undertake to supply water from their water works owing to the available quantity not being adequate.

The New Pratap Mill at Dhulia is still under construction, while the Luxminarayen Mill at Chalisgaum started work during the year under report.

WOOLLEN MILLS

23. There are now 5 woollen mills in Bombay possessing a total of 38,504 spinning spindles and 639 looms. These mills usually manufacture lohis, shawls, rugs, blankets and some suitings. Germany, France, Italy, Belgium, Japan and England import woollens but as these countries confine themselves, with the exception of rugs and blankets, to qualities and styles not manufactured locally, it is not evident that there is real competition between the locally manufactured and imported article. There is however reason to believe that rugs and carpets and blankets from Germany, France, Italy and Japan are imported at competitive prices.

LEATHER CLOTH FACTORY

24. A factory for manufacturing leather cloth, oil cloth, book-binding cloth, etc., has been lately attached to the Dharamsi Morarji Woollen Mills, and started at Ambernath near Bombay. The product of this factory has now been successfully placed on the local market and has been much appreciated by the public. The factory also manufactures thick artificial leather of various colours and patterns suitable for high class upholstery of motor seats and motor hoods, and owing to its excellent quality finds a good market. The book-binding cloth manufactured by the factory is of a decidedly better quality than some of the cheap imported stuff as it is moth proof and water proof, and as a swadeshi enterprise deserves all help and support.

MATCH FACTORIES

25. Owing to the impetus given by the import duty on matches as well as on the undipped splints and veneers for match boxes which remained the same during the year as was pointed out in my last report, all the match factories in the Presidency continued working throughout the year. Two new match factories, both owned and managed by Japanese, were opened in the suburbs of Bombay, one called Asada Match Factory at Kurla and the other Borivli Match Factory at Borivli. There are now 15 match factories in this Presidency giving employment to nearly 5,000 hands daily. The approximate total output of all these factories is estimated at about 40 lakhs gross boxes annually. Except three or four old factories which use indigenous wood from the forests of this Presidency the others import and use match wood logs from Sweden, Japan, Russia, etc.

26. The following table gives an idea of the quantity and value of the foreign matches imported into this Presidency through Bombay and

Karachi harbours during the last five years. From this it will be seen that while the import of matches in Bombay is greatly reduced it is not so in Karachi, there being no match factories in Sindh.

Statement showing the total quantities of matches, with their values, imported into Bombay and Karachi during the past five years :—

	Bombay		Karachi	
	Gross Boxes in lakhs	Value in lakhs	Gross Boxes in lakhs	Value in lakhs
		Rs.		Rs.
1921-22	66	93	0·86	1
1922-23	49	70	6	9
1923-24	48	53	13	17
1924-25	24	24	9	11
1925-26	25	24	13	14

27. During the year practically no undipped match splints were imported into this Presidency but match-box veneers worth Rs. 1,75,124 and matchwood logs worth Rs. 8,16,738 and weighing about 10,000 tons were imported. As against this the Chief Conservator of Forests reported that various match factories were supplied with indigenous match wood from our forests as shown below :—

Western India Match Co. ..	1,321	Tons
Gujrat Islam Match Co. ..	520	,,
Karad Match Co.	490	,,
Santa Cruz Match Co. ..	200	,,
Belgaum Match Co.	14	,,
Total ..	2,545	Tons

28. The total of 2,545 tons of indigenous matchwood supplied to the match factories falls much short of the total requirements of the factories which is estimated at nearly 20,000 tons yearly when they work in their full capacity. However, the efforts of the Forest Department are now directed towards supplying as much matchwood from our forests as could possibly be done to satisfy the local demand. The demand for indigenous matchwood is growing and is bound to increase more in the near future with the growth of match industry in this Presidency. Several kinds of indigenous wood which are now used for splints and boxes are not so good as the imported matchwood in grains, strength, colour, etc., but there may be several others which have never been tried as yet. One of the largest match factories of this Presidency which is very well organised and managed has started making trials and experiments with various species for their own information and benefit with the help of an expert matchwood selector which other small factories cannot afford to do.

Further, the difficulty experienced in obtaining suitable matchwood found scattered over the forest divisions at long distances from the factories is so great that it does not pay to transport the material with the existing high rates of railway freight. It is a point worth investigating whether reasonable concession rates for railway transport of match wood cannot be arranged as a measure of help to this nascent industry.

29. As the match industry has now come to stay in this Presidency permanently, it is now necessary not only to preserve the existing matchwood in our forests which formerly used to be cut down and thrown away or burnt, but systematically to plant and rear some selected species in forests which are nearest to the existing factories or which offer suitable facilities to start new factories in their vicinity. In this way the match factories of this Presidency could be made independent of foreign matchwood the import of which cannot go on indefinitely.

30. During the year under report all the available information regarding the supply of various species of matchwood was given to match factories by circular letters from time to time. A formula for damp-proof chemical composition for match tips which was kindly supplied by the Department of Industries of the United Provinces was circulated only to *bona-fide* manufacturers of matches on their application.

31. During the year this Department was asked by Government to conduct an enquiry into the match industry of this Presidency tracing its past history and to suggest practical means that may be found necessary for stimulating it. In spite of the meagre office staff, the necessary information and particulars have been collected after great laborious work and a full report will shortly be submitted.

32. A new cottage industry has sprung up in the suburbs of Bombay in making empty match boxes from veneers supplied by the match factories now established in Santa Cruz, Andheri, Kurla, Ghatkopar, etc., giving employment to a large number of people who like to work in their own cottages.

33. Ready made veneers, papers, labels, paste, etc., are supplied by the match factories to the cottage workers who with the help of the members of their families make empty match boxes for which they are paid at the rate of one rupee per thousand. A young man can prepare about 700 to 800 boxes per day, and with the help of the members of his family he can even prepare a thousand and more.

34. Owing to the internal competition between the indigenous match factories and also with the imported stuff the prices of matches have gone down much and at the end of the year under report the average wholesale price was Re. 1-5-0 per gross as compared with Re. 1-12-0 in the beginning of the year.

OIL MILLS

35. In the absence of an industrial survey of this Presidency, it is not possible to give a correct figure of the number of oil mills in existence, but from the information I have lately collected on this subject I am able to say that there are about 75 power driven oil mills in this Presidency; besides about 6,000 to 7,000 bullock driven country ghanis. Bombay alone can claim about two dozen oil mills, small and large.

36. The New Oil Mills at Wadala, Bombay, the largest of its kind in this Presidency, which had closed down owing to financial difficulties and had gone into liquidation, started work again with a new management under the control of the official liquidator. This mill is equipped with the most up-to-date labour-saving plant entirely worked by electrical power supplied by the Bombay Electric Supply and Tramways Co., Ltd., and has a capacity of crushing 70 tons of oil seeds per day of 10 hours.

37. In small factories, rotary iron ghanis worked by an oil engine seem to be gaining favour and are slowly replacing primitive bullock driven wooden ghanis in small towns. In larger mills, however, the expeller system of oil extraction is now much preferred to Anglo-American system of hydraulic pressing and many oil expellers are now seen working.

38. However, owing to general ignorance and illiteracy in small towns and villages, it is very difficult to convince people of the advantages of using the most modern methods of oil milling by power driven machinery unless visual demonstrations on actual commercial lines of the working of a power driven factory are given in selected districts in comparison with the existing indigenous cottage methods which are often wasteful.

39. During my visit to Bijapur in the year under report I found on enquiry that there were about 1,000 bullock driven country ghanis in that district which were crushing kardi seed and linseed which are extensively grown there. There is only one power driven oil mill of the expeller type in Bijapur. The Bijapur district yields a large crop of oil seeds and it, therefore, offers a good field for the introduction of the most modern methods of oil extraction by power. A suggestion was accordingly made to Government to demonstrate the advantageous working of power driven rotary ghanis to the local oil millers and it is under their consideration.

40. The oil cake of a bullock driven country ghani often contains a large percentage of residual oil which goes to waste, when the cake is used either as manure or fodder for the cattle. It has been proved that more than a very small percentage of residual oil in the cake is not digested by the cattle and is wasted when the same is used for feeding them, while the oil itself has no manuring value, and it is not only useless but actually harmful as the cake becomes rancid when stored for a long time, with the consequent loss of nitrogen in the form of ammonia. The oil also

re-acts against the moisture and prevents the proper assimilation of the products of the soil. This residual oil in the cake can be effectively removed and recovered by means of the solvent chemical extraction process, but uptil now no attempt has been done in this direction. An up-to-date plant of this description was ordered out and obtained for Karachi by an enterprising firm of an industrialist but it has not as yet been erected.

41. Perhaps it is not generally known that the oil cake as a fertiliser or manure supplies more nitrogen and at a less cost than the imported fertilisers containing nitrate of soda. A very large quantity of all kinds of oil cakes have to be exported to foreign countries from this Presidency where they are used as fertilisers, there being very little demand for them in this country. This is a great drawback of the oil milling industry of this country, the profits of which depend not only on the sale of oil alone but on the quick disposal of the cake. If the Indian farmer is shown the value of oil cake as a good fertiliser, the increased demand that would thereby be created for oil cakes would greatly help the oil milling industry.

42. Edible oils as made at present in this Presidency in power driven mills though often filtered are not refined and bleached. Some oils are sun bleached in order to improve their colour and transparency by exposing the oil in shallow troughs to the rays of the sun, but the turbid and flaky particles contained in the oil are not entirely removed thereby. Perhaps it is not generally known that this cloudiness can be entirely removed by passing the oil after filteration through the cooling coils of a refrigerating machine and kept at a low temperature for some hours after which it is again filtered to eliminate the separated particles of stearine, albumen, moisture, etc. This process makes the oil crystal clear and transparent and enhances its value as edible oil when packed in clear glass bottles. If, therefore, edible oils are refined and made suitable for the requirements of the foreign countries a large export trade in such oils is likely to spring up in this Presidency and we would then be able to export refined vegetable oils instead of the seeds to foreign countries.

43. There is another and more important problem closely connected with the vegetable oil industry of this presidency and that is the manufacture of the so called vegetable ghee which is done by the hydrogenation process. An educated oil miller of Bombay has been experimenting with the hydrogenation of ground nut oil and has succeeded to some extent with some laboratory experiments.

PAINTS AND VARNISHES

44. According to the information available in this office there are four paint works in this Presidency. These were started during the war when the imports of paints and varnishes were restricted and the prices soared

very high which encouraged their manufacture locally ; but as is the case with other similar industries started during the war-time, this local industry has now to face the very severe competition of imports from foreign countries. The Gahagan Paint and Varnish Factory situated at Parel, Bombay, has the largest and well-equipped plant and turns out paints and varnishes of various grades suitable for local requirements. The K. D. Rane Paint Works situated at Khar Road near Bombay also turns out paints of various kinds for the local bazar. The Bijapur Mahaluxmi Company have also a paint factory attached to their oil mill and manufacture good paint in small quantities. The Pioneer Paint and Oil Mills at Mullund near Thana has been closed down owing to heavy losses, and other factories are also threatened with the same fate unless immediate measures are taken to help this nascent indigenous industry. Government, Public Works and Railways are the largest consumers of paints and varnishes, and I am of opinion that preference should be given to paints of indigenous manufacture as far as possible for work for which they are found suitable having due regard to economy and efficiency.

PAPER MILLS

45. There are three paper mills in this Presidency. The Girgaum Paper Mill and the Pudumjee Paper Mill are situated in Bombay while the Reay Paper Mill is situated at Mundawa near Poona. The first is a small concern manufacturing coarse brown packing papers only, while the other two are larger concerns equipped with modern machinery for manufacturing brown papers as well as white and yellow or badami printing and writing papers from imported wood pulp, as well as from rags and gunny cloth waste purchased locally. The last two mills amalgamated last year under the name of the Deccan Paper Mills Co., Ltd., and have been placed under the management of Messrs. N. Pudumjee & Co. Some quantity of paper manufactured by these mills is taken up by Government for their own use.

46. For more than fifteen years past experiments and research work are going on the subject of using bamboo for manufacturing pulp for paper making by the Forest Research Institute at Dehra Dun and several useful bulletins have been published on the subject. Bamboo grows wild and in very large quantities in the forests of this Presidency specially in the forests of the Southern Circle. A small Bamboo Pulp Mill has been erected at the Forest Research Institute, Dehra Dun, where successful experiments have been carried out in manufacturing paper pulp from bamboos grown in Bihar and Orissa and a full detailed report is to be published by the officer in charge of the Paper Pulp Section of the Institute.

47. Last year a scheme for manufacturing pulp from the bamboos of Kanara Forests in the Southern Circle of the Presidency was submitted by

an applicant to Government who suggested that the Government of Bombay should finance the project. The project was investigated by me in consultation with the Chief Conservator of Forests, and a report was submitted by me to Government. The Government approved the project and the applicant was informed through this Department that Government would be pleased to encourage and help him if he could find sufficient finance to establish the proposed factory. The Government have, however, asked this Department to prepare and submit a workable scheme in consultation with the forest authorities and investigations are now in progress.

GLASS FACTORIES

48. Several glass factories were opened in this Presidency during the period of the Great War when the prices of glassware had soared high owing to the limited supply ; but as the product of foreign manufacture began to arrive in abundance after the armistice and was dumped down at very cheap rates in this country, many glass factories could not pull on against the competition and had consequently to close down. Three glass factories, however, still survive : the Ogalewadi Glass Works, Ogalewadi (Satara District), the Paisa Fund Glass Works, Talegaum (Poona District) and the National Glass Works, Mazagaum, Bombay.

49. **Ogalewadi Glass Works** are the largest in this Presidency and seem to be doing well. Besides manufacturing lamp chimneys and other blown glassware they have lately taken to manufacture fancy electric light shades, flower vases, air-tight glass jars and bottles, etc., which sell well. One of the managing agents Mr. G. P. Ogale was awarded a Government of India Scholarship by this Department to receive his training in this industry in Europe in 1922. Mr. Ogale on his return made many alterations and improvements in the works at Ogalewadi and visited Europe again in 1924 at his own expense. On his return from Europe last year Mr. Ogale projected a large extension of the works, including an up-to-date factory for manufacturing hurricane or storm-proof lanterns. The company applied for permission to remove clay and sand from certain districts of Kanara and Belgaum which was granted at the recommendation of this Department. An enamelling department has lately been added to these works for making enamelled sign boards. The work turned out being of very good quality was brought to the notice of the Public Works Department and several other public bodies.

50. **Paisa Fund Glass Works, Talegaum,** have also expanded their activities to some extent and have lately added a pottery section which has been separately treated under " Pottery." They turn out plain lamp chimneys and globes in which there is a very keen competition from similar imported ware. As for instance, globes for hurricane lanterns are now being imported and dumped down in Bombay at about Rs. 1-8-0

per dozen at which rate it is impossible to manufacture them in this country. A very interesting and important feature of these works is the training in glass smelting and glass blowing that is given there and some educated young men have been trained and supplied to other glass factories all over India. This factory seems to have done more pioneer and research work than any other glass factory, besides giving technical education in the manufacture of glassware for the benefit of other glass factories.

51. **National Glass Works, Mazagaum, Bombay,** is catering for the Bombay market in lamp chimneys, jars, globes, etc., and being in the vicinity of a large market can dispose of the product easily without the difficulties of packing and transport charges.

52. **Prabhaker Lantern Factory (Karad).**—The Lantern Factory of Messrs. Ogale Glass Works, Ltd., which was reported to be under erection in my last annual report, was completed and started during the year. This factory is well planned and designed and equipped with the most modern labour saving automatic machines specially for manufacturing the so-called hurricane proof lanterns of the American type which are now very largely imported into this country from America and Germany. The lantern turned out by this factory is of a very high quality which can easily compete with the similar imported articles in price and quality. At present all-brass hurricane lanterns are manufactured and placed on the market, but experiments in manufacturing cheaper tin lantern of similar shape and design are also being carried on.

53. There is a very large demand for these kinds of portable lanterns in towns and villages. In order to solve the difficulty of reliable packing for transport by railway and insure against damage, Messrs. Ogale Brothers, the managing agents of the company, have ordered out and set up two large machines for manufacturing corrugated straw boards for boxes required for packing each lantern separately, the plain straw boards for which purpose being purchased from the Deccan Paper Mills, Poona. The whole lantern, therefore, including its glass globe and straw board box for packing is entirely made by the Ogale Glass Works, Ltd., managed by Messrs. Ogale Brothers, who have received their training and practical experience in England, Germany and America.

54. This lantern was recommended by this Department to other Government Departments such as the Indian Stores Department, the Public Works Department and the Bombay Municipality, some of whom are trying to see if the lantern will prove useful.

POTTERY FACTORIES

55. The semi-commercial pottery factory at Sir J. J. School of Art, Bombay, having been closed by Government at my suggestion to prevent

undue competition with private pottery manufacturing concerns, the Sorab Dalal Tile Works of Than Road (Kathiawad) began manufacturing acid proof jars on a larger scale and have successfully put them on the market. The works opened a selling branch in Bombay and the demand for small and large jars for household and domestic purposes has been reported to be so great that the proprietor of the works does not find the time to perfect the standard jars required by chemical works as containers for various acids manufactured by them. Mr. Sorab Dalal has, however, ordered out some more machines and hopes to meet their demand. Besides jars, this pottery factory manufactures good fire-bricks and clay, Mangalore pattern roofing tiles, boiler and furnace seating blocks, etc., on a fairly large scale and meets the demand of the markets of Gujrat, Kathiawad and Rajputana. The Paisa Fund Glass Factory of Talegaum has also opened a pottery section and manufactures acid proof vitrious jars, toys, electric insulators, fire-bricks and crucibles for glass smelting.

RICE MILLS

56. It is estimated that there are about 200 rice mills, small and large, in this Presidency worked by power, a large number of which are in Thana and Kolaba Districts situated at Bhiwandi, Shahapur, Kalyan, Dahanu, Pen, Panvel, Karjat, etc., etc. Messrs. Dandekar & Co. of Bhiwandi, an enterprising firm of engineers, have specialised in designing and manufacturing complete rice milling plants which are now in good demand in preference to imported rice machinery, as Messrs. Dandekars have utilised their practical experience gained on the spot in designing the plant to suit the local demands and indigenous circumstances. They are now manufacturing paddy cleaners, rice shellers, polishers, separators, elevators and rice pounders, etc., and they have already equipped a number of rice mills with the entire machinery of their own manufacture.

57. The by-product of rice mills is the rice husk which is obtained in a very large quantity and which almost goes to waste when it is not used as a fuel in steam boilers or gas producers for working gas engines. The ashes obtained by burning rice husk contain a very large percentage of silica which can be recovered and used for glass manufacture or for manufacturing silicate of soda, but no attempt seems to have been done to utilise this valuable waste product, and there is no industrial chemist attached to this Department who can tackle this problem.

CHEMICAL WORKS

58. There are two large and well equipped chemical works in Bombay for manufacturing various kinds of heavy chemicals, acids and alkalis. These are Dharamsi Morarji Chemical Works and Eastern Chemical Works. They were started during the war with a view to supplying some of the most important chemical products of indigenous manufacture which

are considered very vital to our other national industries, and though they have succeeded in manufacturing the required products of very good quality, they find it very difficult to face the competition of the imported stuff for want of support and protection.

INDUSTRIAL ALCOHOL

59. Alcohol or spirit of wine as it is popularly known plays a very important part as a chief ingredient or solvent in a large number of chemical, medicinal and industrial preparations. A small quantity of rectified spirit is manufactured in this Presidency while the bulk is imported from foreign countries specially from Java and the Continent. There is a vast field combined with almost unlimited facilities for manufacturing industrial alcohol in this Presidency, as it does not require any great technical skill nor large capital to do it and the raw material mhowa or mhowra flowers from which it is made in this Presidency grow wild and in abundance in some parts. Mhowra flowers are used for spirit and seeds for oil for making soap. The industrial alcohol besides being used in spirituous medicinal preparation in the form of rectified spirit is also used for making varnish or burning in stoves as methylated spirit.

60. More than three crores of rupees worth of foreign spirit is imported into this country annually, both potable and industrial, the former from Europe and the latter from Java, out of which about one-third is consumed by this Presidency. There is only one small distillery in this Presidency at Ahmedabad belonging to the Gujrat Chemical Works which produces about 100 gallons of rectified spirit per day. In the distillery of the Alembic Chemical Works of Baroda about 400 gallons are produced daily. However, the total quantity produced by these two distilleries represents only about one per cent. of the total consumption in this Presidency. With the resources of cheap raw material at our disposal there is no reason why a considerably greater proportion of the requirements of this Presidency cannot be manufactured locally.

61. Rectified spirit which is alcohol in its purest form is used for potable purposes such as for making brandy, whisky and medicinal tinctures and other preparations. The excise duty on this is Rs. 17-8-0 per proof gallon for Indian made spirit and Rs. 21-14-0 for imported spirit. This is quite in the fitness of things as it has given an impetus for using Indian made spirit for all potable purposes. For industrial purposes the rectified spirit is methylated or denatured by the addition of some drug to make it unfit for human consumption. The duty on spirit to be methylated and used for industrial purposes is only 7½ per cent. *ad valorem* and although there is no duty on Indian spirit used for methylation yet it is found cheaper to import almost the whole quantity of spirit from Java to be methylated in Bombay, as the cost of Indian spirit is higher.

62. The Industrial Commission in paragraph 96 of their report make the following observations on this point :—

"On several occasions our attention was drawn to the possibility of making industrial alcohol from hitherto neglected vegetable materials some of which appear to be sufficiently promising to justify investigation and experiment. We recommend that a more liberal policy should be followed by the excise authorities in respect of the class of denaturant prescribed and more regard might be paid to the likelihood rather than to the mere possibility of frauds upon the revenue, when the requirements of commercial users conflict with excise regulations."

STEEL FURNITURE

63. Messrs. Godrej and Boyce, the well known makers of fire and burglar proof steel safes, have lately established a separate department for manufacturing steel cupboards and shelves. These cupboards are neatly designed and well made and compare very favourably with the wooden cupboards in their strength and moth proof quality. These cupboards are decidedly stronger and better made than similar imported ones.

64. Messrs. Kirloskar Brothers of Kirloskarwadi have also embarked upon making steel shelves and chairs, etc. Their chairs are neatly made and have already been supplied in very large numbers to Bombay and other places.

WRITING NIBS

65. I visited two factories situated at Malwan (Ratnagiri District) manufacturing writing nibs. Both the factories make hardened brass nibs of the "relief" type only. The factory belonging to Messrs. Haldanker, Rege & Co., is the oldest nib factory in Malwan which is equipped with very ingenously and neatly made hand machines all designed and made by Mr. Haldankar in Malwan, which is very creditable to him. The nibs made by this factory pass through five or six processes and each nib is finally examined by a magnifying glass before passing it on for packing. The other factory called the Rani Nib Factory has been recently started. The Malwan nib industry deserves all support and encouragement and Government of Bombay have been purchasing a large quantity of these nibs for their various offices.

SOAP

66. There are two large soap factories in Bombay both of which were visited by me during the year. The Godrej Oil and Soap Works at Surti Mohalla, Byculla, manufacture bar soap of very good quality from vegetable oils of their own make which finds a ready sale. The Godrej Toilet Soap Factory which was under construction last year was completed this year and started work. The factory is well equipped with modern soap making machinery and produces fine toilet soaps from

vegetable oils only for which there is a good demand in this country owing to the religious prejudice of the Hindus against soap made from animal fat.

BISCUIT

67. A branch factory of the Britannia Biscuit Factory of Calcutta was erected in Bombay and started work last year. This factory is equipped with two large gas fired aluminium furnaces and other up-to-date machinery for making biscuits on the lines of biscuits imported from foreign countries in tins and packets, and the product turned out by the factory has been found to be of a very good quality which can easily compete with the imported stuff in quality and price. The factory is situated in its own building at Mazagaum which is well lighted and scrupulously kept clean. With all the raw materials available in this country for this kind of industry, there is no reason why this industry should not expand and develop specially in the vicinity of one of the largest markets and sea-ports like Bombay.

RAW HIDE PICKERS

68. During the great war when the import of mill stores was restricted and prices soared high, several factories for manufacturing raw hide pickers used in power looms were established in Ahmedabad which thrived for some time owing to high prices and absence of competition from foreign imports ; but as soon as foreign pickers began to arrive and compete with the local manufacture the factories closed down. At present only one factory owned and managed by Mr. M. G. Mansuri, B.A., is working and manufacturing very good pickers. The proprietor of the factory being an educated young man sought the help of this Department. Samples of his pickers were sent by this Department to the Calcutta Leather Research Institute for being tested and criticised upon and, with the help of instructions and suggestions received from the Institute, Mr. Mansuri has been able to improve his manufacture greatly. The pickers are now used by some of the mills at Ahmedabad and they are being tried in one of the mills at Sholapur at my request. Mr. Mansuri has utilised his university training in science in the right direction in applying it to a practical problem and his case should serve as an object lesson to other science graduates.

BRUSHES

69. Messrs. Framroz & Co. have put down a new brush factory at Gowalia Tank Road, Bombay, after their old factory was burnt down by fire last year. The new factory contains some good machines for manufacturing brushes of all kinds and for all purposes from the finest toilet brushes to the domestic and industrial brushes. The brush factory is attached to a small saw mill equipped with wood working tools all worked by electric power.

RAILWAY RATES

70. Complaints are made from time to time regarding unduly heavy railway freights, the allegation being that the tariff interferes with the easy and cheap inland transportation of products of indigenous industries and raw materials. This question is not a new one ; the Industrial Commission remarked in paragraph 271 of their report (1918) that the grant of port rates at nearly 50 per cent. less than the internal rates had discouraged the Indian tanning trade and aided certain foreign industrialists to obtain a hold on a class of raw material of which India possessed a partial monopoly. Mere allegations without definite evidence are however of no use. Specific instances must be cited and a complete case put forward for consideration.

MANUFACTURE OF MACHINERY

71. As was stated by me in my last annual report some iron works have begun manufacturing machinery specially suitable for small industries closely allied to agriculture such as cotton gins, ploughs, sugarcane crushers, rotary oil mills, rice mills, corn grinding mills, ground-nut shellers, pumps, saw benches, etc. During the great war machinery was not only scarce but was quoted at very high prices. This seems to have given an impetus to the manufacture of machinery in this Presidency, and some large works were established for this purpose two of which were visited and mentioned in my last annual report.

72. Another large factory that has come to my notice recently is Kirloskar Brothers' Works at Kirloskarwadi in Aundh State. These works are well laid out and equipped on the most modern lines and are capable of turning out very good work. The works were started with a view to manufacture iron ploughs and other agricultural implements and machines and during the boom period the works employed more than a thousand hands daily but these works like others of similar kind had to pass through vicissitude brought about by the unusual trade depression. Vast alterations have, however, been effected of late in the works and instead of concentrating all their activities to the manufacture of agricultural implements they have now started manufacturing machinery such as deep well pumps, centrifugal and reciprocating pumps of various kinds, paper cutting knives suitable for book binders, proof press for printers, ground-nut shellers, etc.

73. The most interesting piece of machinery, however, shown to me by Messrs. Kirloskar Brothers was an oil engine running a centrifugal pump both being mounted on a common base. The engine which was of about 3 Brake Horse Power was entirely made at the Kirloskarwadi Works except its magneto and kerosene oil carburettor which were imported and the pump was also of their own make. A working demonstration of this small pumping plant was given to me and it seemed to work well. The

small plant is suitable for agriculturists and Messrs. Kirloskars now intend to place a number of these on the market in competition with similar imported ones at a competitive price. The engine has been so designed that it can work as a gas engine without much alteration in its setting, and Messrs. Kirloskars are now busy designing and making a small gas generator to work on charcoal suitable for the size of the engine. This is an effort in the right direction and deserves all encouragement, as there is really a demand for a small foolproof power pumping plant working on a fuel that could easily and cheaply be procured in out of the way villages situated in purely agricultural areas.

74. Two other large firms which have started manufacturing industrial machinery in this Presidency are Messrs. Ardeshir D. Wadia & Sons of Ahmedabad who have made a speciality in manufacturing cotton gins and their spare parts, and Messrs. Dandekar & Co. of Bhiwandi who have specialised in manufacturing complete rice milling plants.

MANUFACTURE OF CONTAINERS

75. The ability to preserve and transport various kinds of industrial and agricultural products depends on the supply of suitable containers. Vegetable oils of all kinds which are largely produced in this Presidency can be exported by land or sea if good wooden casks are produced here. The Forest Department has not found out any suitable and cheap wood as yet for manufacturing casks to replace the second hand oak-wood beer casks which are used for packing oils in bulk, and teak wood has been found too brittle and costly for this purpose. Old kerosene oil tins are largely used for packing vegetable oil but they require to be repacked in dealwood cases in order to protect them against rough handling which makes the cost of packing prohibitive. The manufacture of suitable containers or receptacles suitable for packing and transporting various products is, therefore, vital to several industries. Many small works worked by power have lately been started in Bombay with the help of the most up-to-date machinery for turning out solderless tin cans of various sizes and shapes of the so called " vacuum packed " type. These are now largely used for packing oils, tea, butter, ghee, coffee, etc., and they have given a good impetus and help to local industries in providing neat and attractive packing.

76. Similarly, Ogalewadi Glass Works (Ogalewadi, Satara District) have started manufacturing air tight glass jars, and shapely bottles which are in good demand, and Talegaum Glass Works and Sorab Dalal Tiles Works (Than Road, Kathiawad) have successfully manufactured and placed on market acid proof jars of various sizes suitable for packing pickles, fruit preserves, acids and for various other purposes.

77. Several factories have lately been started in Bombay for manufacturing paper boxes for packing various articles of indigenous manufacture such as hosiery, boots and shoes, bottles for patent medicine, toilet soaps, etc., and Prabhaker Hurricane Lantern Factory of Ogalewadi (*via* Karad) manufactures corrugated straw boards with single and double corrugations suitable for such boxes out of indigenous straw boards. This has decidedly given a good impetus to indigenous manufacture of various articles by providing an attractive form of packing which was badly wanted.

MANUFACTURE OF HARDWARE

78. During the year under report I visited a number of factories in Bombay, manufacturing brass and aluminium household pots and cooking utensils which cater largely for local and upcountry markets in this kind of domestic wares. Some of these are equipped with the most up-to-date plant for pressing and spinning metal and produce various forms of brass and aluminium ware that suit the local tastes and requirements. The local manufacturers have to study carefully the tastes and requirements of various communities before placing the products of their manufacture on the market as some forms or designs appeal exclusively to the fancy of Hindus or Mohammadans only. The factory of Mr. Mitha Kasam on Tardeo Road, and that of Mr. Anant Desai Topiwala on Lamington Road, seem to be doing good business in this line.

79. There are also several factories set up in Bombay for manufacturing door fittings such as brass hinges, door bolts, tower bolts, hatpegs, handles, knobs, etc. Such articles turned out by Acme Manufacturing Co. of Sleater Road, Grant Road, are of very superior quality and deserve support, as they can easily compete with similar imported articles in price and quality, as the works of this company are well equipped with up-to-date machinery.

80. Galvanised water buckets, petrol drums, oil cans, travelling trunks, cash boxes, tin cans, receptacles and containers of tinned and galvanised iron sheets are now largely made in Bombay with the help of labour saving appliances and machinery. The factories of Messrs. Musaji Valibhai Null Bazar, and Messrs. S. Sulemanjee, Khetwadi, were visited.

81. Awell equipped bolt and nut factory with up-to-date labour saving appliances has been put up by Messrs. Kirloskar Brothers at Kirloskarwadi (District Satara). This factory is an unique one in this Presidency as, except in railway workshops, automatic machinery for making bolts and nuts in large quantities is not seen anywhere else in this Presidency.

82. Steel fire-proof and burglar proof safes and brass pad locks are made in Bombay, Surat and Ahmedabad, while steel travelling trunks and boxes are also made in these places and in Karachi.

CHEAP POWER

83. Advice of this Department is often sought to suggest and recommend a power plant for producing cheap power, and it has been advocating the use of crude oil engines for small industries. This type of power plant is now fast replacing the old type wasteful steam engine in small industrial factories such as cotton gins, oil mills, flour mills, rice mills, ice factories, etc., and many of the new factories are now equipped with such a plant. Last year a large flour mill of Karachi replaced its old wasteful steam engine by a new gas engine of 600 horse-power, which resulted in a saving of more than 60 per cent. in the cost of fuel.

84. When the coal was controlled and its price was high, several cotton spinning and weaving mills in Bombay changed over from coal to crude oil by fitting oil fired furnaces to their steam boilers, but owing to the recent fall in the price of coal some have again reverted to coal firing. Oil merchants, however, promptly reduced their price of crude oil for burning in steam boilers in proportion to the heat giving (calorific) value of both fuels when used in a steam boiler. Roughly it is estimated that one ton of crude oil fired in a steam boiler can replace two tons of Bengal coal. It is, however, interesting to note here that while one horse power can be produced by burning half a pound of crude oil in an oil engine, a high class steam engine consumes at least two pounds of coal or one pound of crude oil in its boiler per horse power per hour.

85. The Tata hydro-electric power mains pass through many rice growing districts of Konkan on their way to Bombay from the Ghats. A scheme was, therefore, suggested to Government by this Department last year whereby electrical power could be tapped and purchased in bulk from the supply company by Government Electrical Department, and distributed at a reasonably cheap rate to various rice mills of Panvel and surrounding districts of Konkan. It would be a very interesting scheme from an industrial point of view and can be copied in other districts and suburbs of Bombay through which Messrs. Tata's mains pass.

ROSHA OIL

86. Nothing has been done so far in working and demonstrating the new still for the distillation of rosha grass oil since its arrival from England in 1923. Last year no sufficient funds were available to make the experiment. A proposal was, however, made by the syndicate who have secured the contract for collecting the rosha grass from the forests to work the plant and demonstrate it to those who take interest in distilling this oil on commercial lines, but the proposal could not be accepted as the terms and conditions were not suitable.

FISH OIL

87. The sardine oil plant remained idle at Majali (District Karwar) for want of adequate supply of fat sardines suitable for extracting oil, and also for want of sufficient staff and funds. A small charge is made to keep the press and oil tank clean and free from corrosion.

BUTTON MAKING MACHINERY

88. The machinery for making buttons from horns, bones, and some kinds of dried nuts that was designed and made for this Department in the Dapuri Workshops, Poona, some years ago, was never tried and put to work here on commercial basis. It was loaned to the Department of Industries, United Provinces, for experimenting purposes in the year 1924, but the plant was not erected and put to work till last year. The Director of Industries, U. P., has now reported that the plant has been erected in the Technical School, Gorakhpur, and after some necessary minor alterations has been started on trial. Some samples of buttons turned out were sent to this Department. A full report of its working on commercial basis was promised and is now awaited.

STATE AID TO INDUSTRIES

89. Six applications were received by this Department during the year for financial help. Of these four were from Joint Stock Companies, and two from individuals. The total sum applied for by the six applicants was Rs. 16,55,000—the industries represented being oil mills, glass factory, brick and tile factory, nib factory, a dairy concern and a flour and oil mill. No recommendation was made in the case of three of the applicants as the required amount of security was not forthcoming; two applications are still under consideration; the sixth case was recommended by the Department but Government were unable to accede to the request made. A loan of six lakhs of rupees was given to a sugar manufacturing concern. The conservative attitude which Banks are adopting in the matter of loans to manufacturing concerns has caused some difficulty and some industrial firms are passing through critical times for want of sufficient finance.

EXHIBITIONS

90. The accounts of the British Empire Exhibition, 1924, were finally closed in May 1926 and submitted to Government and the Accountant General for their acceptance. This work was done by Mr. R. D. Bell, C.I.E., I.C.S., in his capacity as the Chairman of the British Empire Exhibition Committee till he proceeded on leave in May 1926. The gross expenditure on all accounts was Rs. 1,40,179-13-3 and the net was Rs. 1,05,625-3-4 against the sanctioned grants of Rs. 1,80,000 and

Rs. 1,00,000 respectively by the Legislative Council. On the whole, the Exhibition seemed to have proved useful to the Indian participators, as the firms who took part in 1924 again applied to this Department for reserving space for them in the show of 1925.

91. The Department also took part in the following exhibitions held in this Presidency during the year and exhibited all the improved appliances and processes pertaining to hand sizing, hand weaving, dyeing and calico printing, etc., etc.—

(1) Industrial Exhibition, Poona ;

(2) Vishwa Bharat Exhibition, Bombay ;

(3) Industrial and Agricultural Exhibition, Malegaum.

TECHNICAL EDUCATION

92. Under this heading the grant of technical scholarships in chemistry and electrical engineering as well as of the State Technical Scholarships is kept under the control of this Department. The scholarships granted during the year consisted of two special scholarships in electrical engineering tenable abroad and three new scholarships in chemistry, two of which were tenable at the Royal Institute of Science, Bombay, and one was tenable at the Indian Institute of Science at Bangalore. Besides these, one new scholarship in electrical engineering, tenable at the Institute of Science at Bangalore, was also granted, and scholarships of three old scholars in chemistry and one for electrical engineering were extended for the second year. In all, eight scholars were maintained at these two institutions by the Government of Bombay during the year.

SURVEY OF ART-CRAFTS

93. In 1920, the Secretary of State for India forwarded certain correspondence touching on the subject of Indian Arts and Crafts from Lt. F. M. De-la Coze, Mr. Havell and the India Society, to the Government of India with a request to offer suggestions on the report and recommendations of the India Society, for improving and helping the arts and crafts of India. In 1921, the Government of India in their turn forwarded the papers for the opinion of the local Government, who consulted the Superintendent of Archæological Survey, Western Circle, and the Director of Public Instruction, both of whom submitted their views on the report. The Government of Bombay forwarded their views to the Government of India, at the same time asking the Director of Public Instruction to submit proposals to open an exhibition sale-room in Bombay in consultation with the Director of Industries, the Principal of Sir J. J. School of Art and the Inspector of Drawing and Craft-work.

94. Early in 1923 the opinion of the Advisory Committee of this Department was taken which unanimously approved the proposal of

establishing an exhibition sale-room in Bombay for the products of cottage workers in arts and crafts, and was communicated to the Director of Public Instruction.

95. Early in 1924, when the post of the Director of Industries was to be abolished, the Director suggested that the scheme might be held in abeyance, and when the same appointment was recreated in 1925, Government asked my opinion on the details submitted by the Director of Public Instruction. I suggested that before a definite scheme could be formulated for establishing the exhibition sale-room for art-craft workers, it was necessary to have a complete survey of the existing art-crafts made by an experienced technologist who could judge and appreciate the productions of artists and artisans from their artistic point of view and not only from their intrinsic value. In the absence of such a survey, it was not known where and what kinds of art-crafts were carried on in the Presidency. This suggestion was accepted and approved by Government, and, on the recommendation of the Principal of Sir J. J. School of Art, who was consulted by me in the matter, the name of Mr. G. P. Fernandes, Assistant Curator of the Art Section of the Prince of Wales Museum, was suggested to Government for the survey work. Prior to the starting of the survey work, however, this department had issued a circular letter to all the Collectors in this Presidency requesting them to state the names of places in their respective districts where various kinds of art-crafts were carried on, and the information thus collected was found very useful to the surveyor in his work.

96. Mr. G. P. Fernandes was appointed on the 20th July 1926 as the Surveyor of Art-crafts under the control of this Department and he was asked to investigate and report on the chief art-crafts of this Presidency such as carpets, calico prints, hand-woven silks, kinkhobs, embroidery, lace, carved sandal-wood work, lacquered work, jewellery, etc., etc., giving his views on their intrinsic and artistic values, comparative prosperity of the trade, market for the goods and the possibility of improvements in the methods of manufacture. The survey work is in progress.

COTTAGE INDUSTRIES

97. In the absence of a complete industrial survey of this Presidency it is not known which cottage industries are carried on here, and what is their present condition. The low standard of living in India is a powerful factor in the rivalry with modern industrialism. Indian labourers when they work for others for wages are very inefficient and not amenable to strict discipline, but the cottage workers on the contrary are more efficient and hard-working, when they work for themselves independently. This is one of the reasons why cottage industries still survive so largely in this country.

98. There are so many different kinds of cottage crafts carried on in this Presidency that it is very difficult to suggest measures as regards State help that may be found suitable for all of them. Some of the cottage workers are experts in their crafts which cannot be improved and any attempt to improve them has to be done very judiciously and cautiously, if attempted at all.

99. To help the cottage workers and to elevate their condition, it is necessary to organise a well-planned system of training the children of the artisans in the vocations of their parents in properly equipped industrial schools attached to primary schools in important towns. It is not difficult to teach elementary carpentry and black-smithy in village schools in rural areas so as to impart some instruction and practice in the use of ordinary plain tools to the sons of agriculturists to enable them to do petty repairs to their agricultural implements. For specialized cottage crafts, however, I suggest the following methods of help :—

(1) Use of better and most modern tools and appliances may be stimulated and better methods of working may be taught to the cottage workers through technically trained circle officers attached to this Department.

(2) A central buying agency and an exhibition sale-room may be established in large towns to buy and dispose of the articles made by cottage craftsmen.

(3) Cheaper credit may be made available to approved cottage workers.

(4) New designs and patterns may be introduced amongst the craftsmen to suit modern tastes and requirements.

(5) Propaganda may be instituted for educating the taste of the public for indigenous art-crafts and other articles manufactured by cottage craftsmen.

(6) Cottage workers may be induced and encouraged to form co-operative societies amongst themselves.

HAND-WEAVING INDUSTRY

100. The Department of Industries continued to help and advance the hand-weaving industry which is the premier cottage industry of this Presidency by means of weaving schools and demonstrations. The system of their working has been outlined by me in my last report. It may here be mentioned that the production of hand-woven cloth has increased by 40 per cent. over what it was about twenty-five years ago, and the percentage of hand-woven cotton cloth to the total consumption of cotton cloth in this country is now about 29 per cent. which was 27 per cent. twenty-five years ago.

101. **Situation of Weaving Schools.**—In the beginning of the year under report there were eight weaving schools held at—

Parola (East Khandesh District),
Patherdi (Ahmednagar District),
Vinchur (Nasik District),
Bijapur (Bijapur District),
Betgeri (Dharwar District),
Surat (Surat District),
Broach (Broach District) and
Bulsar (Surat District).

They all helped towards introducing fly-shuttle looms in the surrounding weaving centres. The Weaving Schools at Vinchur and Betgeri were closed and transferred to Niphad (Nasik District) and Gajendragad (Dharwar District) in April and June 1926 respectively as the results were satisfactory.

102. The number of fly-shuttle looms introduced at these centres is as follows :—

Division	Name of Place	Number of fly-shuttle looms introduced
Central Division	Parola	300 Looms
" "	Patherdi	105 "
" "	Vinchur	142 "
" "	Niphad	10 "
Southern Division	Bijapur	40 "
" "	Betgeri	15 "
" "	Gajendragad ..	2 "
Northern Division	Surat	73 "
" "	Broach	16 "
" "	Bulsar	18 "

The schools at Parola and Bijapur have been continued for another year as the weavers and other leading persons of these towns repeatedly requested this Department to retain these schools for a further period of about two years.

103. **Weaving School for Agriculturists.**—At the suggestion of the Provincial Board of Agriculture, an experimental weaving school for agriculturists only was opened in 1922 to train agriculturists to take up weaving as a spare time occupation. This was continued during the year under report and the school was opened in Benkanhalli (Belgaum District) at the suggestion of the Department of Agriculture on the agricultural farm of Mr. V. S. Phaterpekar. A detailed report of its successful working was submitted to Government on 2nd February 1926. It was found that six looms were purchased by agriculturists and they were working on them. On the recommendation of Government to continue such an experiment for another year, the Benkanhalli School was closed

and transferred to Ibrahimpur, a village in the Dharwar District, suggested by the Department of Agriculture. There are nine looms working in the school and pupils from agriculturists only attend it. They are taught to weave plain cloth such as khadi, gudar, dhoti, shirting, coarse blankets, chudders, etc. A full report on the working of the school from its beginning at different centres is given in Appendix A to my report of 1924-25.

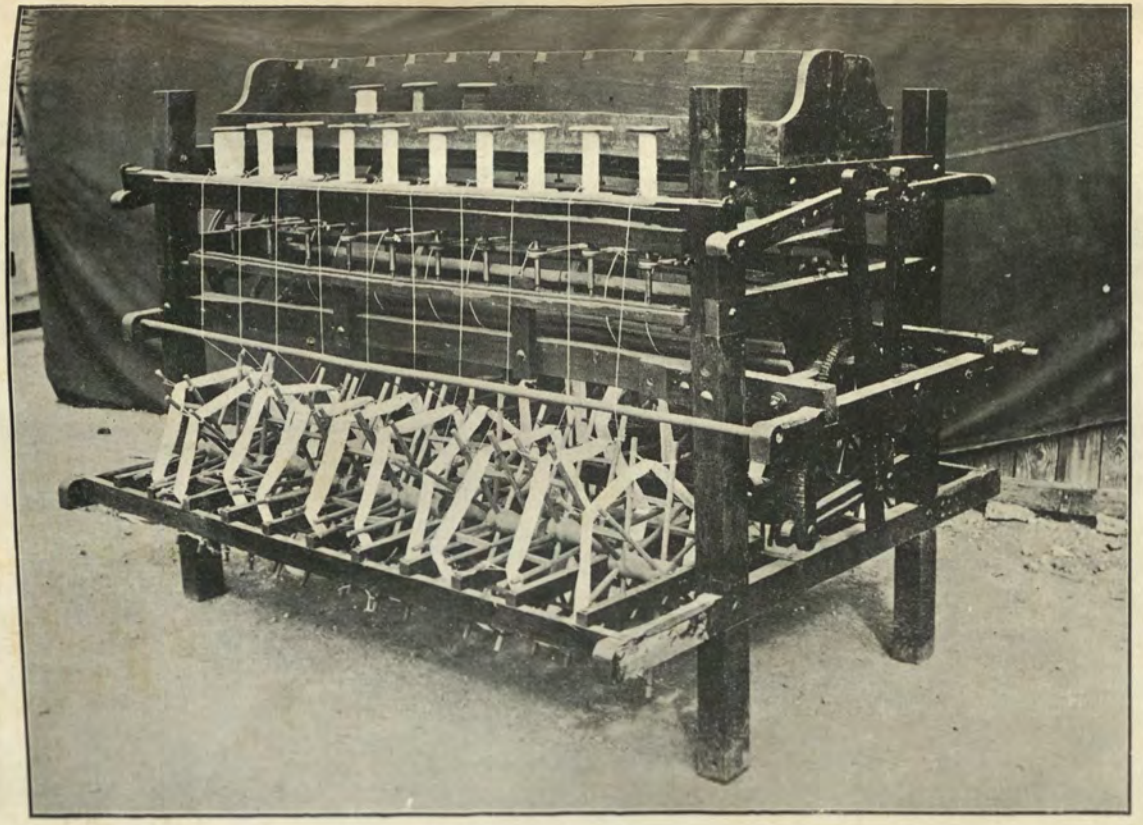
104. **Situation of Weaving Demonstrations.**—Peripatetic weaving demonstrations were carried on at seventeen places during the year in Central, Southern and Northern Divisions. They were situated at—

Pimprala and Nasirabad (East Khandesh District).
Barsi and Madha (Sholapur District).
Alur and Mulgund (Dharwar District).
Kerur and Govinkop (Bijapur District).
Deshnur and Vantmuri (Belgaum District).
Rajapur and Ashta (Satara District).
Abrama (Surat District).
Karamsad, Borsad, Vadtal and Pandoli (Kaira District).

105. The number of fly-shuttle looms introduced at these places is given below :—

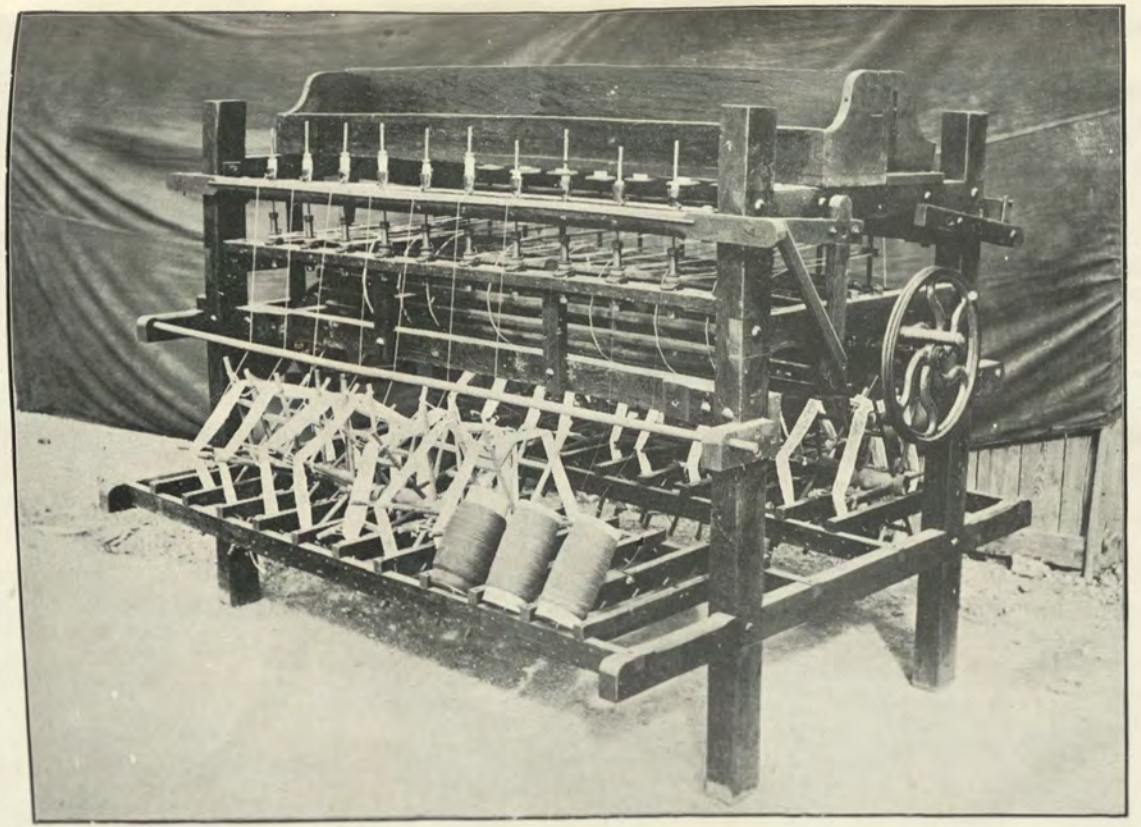
Division	Name of place	Number of fly-shuttle looms introduced
Central Division	Pimprala	38 looms.
Do.	Nasirabad	40 ,,
Do.	Barsi	30 ,,
Do.	Madha	10 ,,
Southern Division	Alur	52 looms.
Do.	Mulgund	*Nil.*
Do.	Kerur	75 looms.
Do.	Govinkop	15 ,,
Do.	Deshnur	42 ,,
Do.	Vantmuri	*Nil.*
Do.	Rajapur	2 looms
Do.	Ashta	5 ,,
Northern Division	Abrama	26 ,,
Do.	Karamsad	10 ,,
Do.	Borsad	2 ,,
Do.	Vadtal	5 ,,
Do.	Pandoli	*Nil.*

106. In the year under report the demonstration at Pimprala was closed and transferred to Nasirabad in November 1925, that at Barsi was transferred to Madha in May 1926, that at Alur to Mulgund in November 1925, that at Kerur to Govinkop in May 1926, that at Deshnur to Vantmuri in June 1926, that at Rajapur to Ashta in April 1926, that at Karamsad to Vadtal in July 1926, and that at Borsad to Pandoli in July 1926.



Hand Winding Machine for Warp Bobbin

(*Vide* para 109)



Hand Winding Machine for Weft Pirns

(*Vide* para 109)

107. **Demonstration of improved preparatory appliances and methods for hand-weaving.**—The art of the hand-weaver does not lie solely in the use of the shuttle. The preparatory processes of hand-weaving are laborious and slow and require much thought and experimental work to improve them. The handloom has been much improved by introducing the fly-shuttle sley but the primitive preparatory processes of winding, warping and sizing have remained the same. The preparation of the warp involves the filling of bobbins with yarn from hanks and that for weft requires the filling of pirns for the shuttle. Old methods of doing these operations on a hand charkha or Rehntia are very slow. The Department of Industries is demonstrating and introducing improved and up-to-date methods for these preparatory processes for which several hand-driven simple machines have been designed by the Department as shown in the illustrations given in this report.

108. **Bobbin and Pirn Winding.**—There are numerous handloom factories in this Presidency containing from five to ten handlooms or more which are much handicapped for the supply of bobbins for the warp and weft. Quite a number of persons are engaged to fill bobbins and pirns on charkhas from hanks of yarn in such factories, and keep them ready for the weavers. As one man or woman can work only one charkha at a time the work of filling bobbins is rather slow and costly.

109. In order to help these factories of handlooms a combined bobbin and pirn winding machine worked by hand has been designed and made by this Department, an illustration of which is given here. The machine is built of strong wooden frame containing a few iron parts and is very simple in construction and easily understood by a man of average intellect, who can easily put it right when anything gets out of order. There are twelve spindles for winding warp bobbins on one side and twelve spindles for winding weft pirns on the other side both driven by a central wooden drum. It can also be made to wind bobbins or pirns only on both the sides. Hanks are mounted on very light wooden or bamboo swifts from which the ends of threads are taken on to the bobbins mounted on the spindles. There is an automatic traverse motion provided on both the sides which fills the bobbins evenly. One unskilled boy is required to turn the machine which is easy to work while another boy mends the broken ends.

110. This machine was made and demonstrated at Sholapur during the year under report and aroused much interest amongst the owners of handloom factories. Altogether nine winding machines of this type were made by the Co-operative Weavers' Union at Sholapur for their weavers under the guidance and supervision of the weaving assistant of this Department, out of which one combined warp and pirn winding machine was purchased by the Criminal Tribes' Settlement at Sholapur for their own use.

111. **Warping and Sizing.**—After the preparatory process of winding of bobbins and pirns comes the process of warping and sizing. The usual village method of preparing the warp consists in stretching and spreading it on stakes in the open yard. Another method which is followed in some handloom factories is to wind the warp in sections on a large wooden drum. The warp is then sized in three different forms such as sheet, hank and ball. In the first method the warp is stretched in sheet form between two stakes or trunks of trees and brushed with size by means of a wide hand brush. The second method consists of steeping the hanks in light size before the warp is prepared. In the third method the balls of sectional warp are steeped in light size. All these are wasteful methods requiring much time and labour, and the warp not being more than 20 to 30 yards in length, the changing of warp on the loom after every two or three days' work necessitates the stoppage of the loom and an undue waste of time.

112. The improvement of the warping and sizing processes is now the chief problem of the hand-weaving industry and I have been paying particular attention to this problem for the past four or five years and have endeavoured to evolve improved methods of warping and sizing suitable for handloom factories as well as for individual weavers, so as to save much of their time and labour in these preparatory processes. A brief account of the experiments and tests carried out by me at various places in this direction and of the success attained was given in my last annual report for 1924-25 in which illustrations and descriptions of two hand worked warping and sizing machines evolved and demonstrated by this Department at Sholapur were given.

113. **Beam Warping Machine.**—As described above the hand weaver usually uses his warp in the form of balls or sections. This does not give uniform stretch in the warp and results in uneven cloth, unless the weaver is very careful in adjusting the stretch uniformly every time he draws a certain length for weaving. In order to do away with this difficulty a simple warping machine has been devised and constructed by this Department which is illustrated here. It consists of a wooden creel for warp bobbins wound on the winding machine already described. The ends are passed through a reed and a pair of rollers, and, after providing for the necessary lease arrangement, are wound on a large bobbin which is called beam. By this process all the ends come under uniform tension and are evenly wound on the beam. Four or five such beams, according to the number of ends required in a certain warp, are then placed behind the large sizing machine and the yarn is sized. This machine is suitable for a factory of hand looms which work on warp beam system and not on sectional ball warp system. This warping machine is, therefore, a necessary adjunct to the large sizing Machine.

Beam Warping Machine (*Vide* para 113)

Cottage Warping and Sizing Machine

(*Vide* para 114)

Large Iron Hand Sizing Machine

(*Vide* para 115)

114. **Cottage Warping and Sizing Machine.**—The cottage sizing machine which was constructed last year and described and illustrated in my last annual report is specially designed for an individual weaver having two or three looms in his cottage. This machine was improved further by introducing a drying chamber as shown in the accompanying illustration. The drying chamber consists of an iron box through which the sized yarn is passed on wooden rollers before it is wound on the drum in sections. There is a small charcoal stove underneath the drying chamber to keep it heated but the yarn is not subjected to the direct heat of the stove. Means are provided to reduce or increase the temperature of the drying chamber as required. The machine costs about Rs. 75 to make and can prepare a warp of 120 ends directly from a creel of bobbins placed at its back and size the same at the same time. It is a sectional sizing machine in which 18 sections of 120 ends, each measuring up to 200 yards in length can be prepared, each section requiring about an hour to warp and size, with the help of only one man. These sections are removed and placed at the back of a fly-shuttle loom in the form of balls, the number of sections depending upon the number of ends required in a warp. It is possible to put from 5 to 20 per cent. of size on the warp yarn in this machine at a cost of from Rs. 2 to 2/8 per 10 lbs. of yarn. Four such machines were made and supplied to local weavers of Sholapur during the year under the supervision and guidance of the weaving assistant in charge of the Demonstration, out of which one was supplied to the Criminal Tribes' Settlement at Sholapur.

115. **Large Iron Hand Sizing Machine.**—This machine was rebuilt this year and many improvements were added in it, specially in its drying chamber which is now heated from hot gases and products of combustion emitting from the chimney of a small charcoal fired pressureless boiler which supplies steam to the size box in order to keep it boiling while the machine is at work. The newly designed heating and drying chamber offers a surface of about 70 square feet to the sized yarn which is dried by the heat radiated from the surface of the chamber kept hot by the smoke from the boiler as stated above. Thus there is no fear of the yarn becoming charred or discoloured either by direct heat or smoke impinging on it. As the yarn, while drying, does not come in contact with the drying surface it is not flattened as in the case of the slasher sizing machine used in cotton mills, and a revolving brush keeps the yarn round and evenly sized.

116. This machine as well as all other winding, warping and sizing machines have not been patented by this Department and are, therefore, permitted to be copied and constructed by any weaver or weaving factory that may be in need of them and find them useful for their work. This large-sizing machine can be constructed at a cost of about Rs. 700. The wooden warping machine designed and constructed by this Department referred to above is a necessary adjunct to this sizing machine. It costs

about Rs. 150 with creel containing about 400 bobbins. The warp bobbins filled from yarn hanks in the hand-winding machine are placed in the creel of the warping machine and a beam of 400 ends or so is prepared. Four or five of these unsized beams are placed behind the large-sizing machine and a warp of from 200 to 400 yards containing from 1,000 to 3,000 ends is prepared and sized on the machine. The sized beam is afterwards placed behind a fly-shuttle loom and woven into cloth. The large-sizing machine is lightly constructed so as to be easily turned by an unskilled labourer, while a skilled hand is necessary to piece the broken ends and attend to the size box.

117. The machine while under construction was closely watched by some prominent weavers of Sholapur whose requirements have been embodied in its design and construction and two of them after having satisfied themselves with its trial have set up weaving factories each containing about two dozen power looms worked by an oil engine and have applied to this Department for help and supervision in having two such machines specially constructed for their factories. This demonstration of improved appliances for hand weaving which was to be removed to Surat, as stated in my last annual report, has, therefore, been still retained at Sholapur for a further period of six months pending the construction of the sizing and other machines required by these factories.

DYING AND CALICO PRINTING

118. Dyeing and calico printing cottage industries are closely allied to the textile industry and are therefore next in importance to the hand-loom industry. Calico printing is mostly done by block printing in Ahmedabad District and Sindh. There are calico printers in Bombay and Surat also and a number of factories are opened in Bombay to print cloth by the ærograph or stencil process in very beautiful designs. Dyeing of cloth and yarn is carried out in all the important towns and villages. Persons engaged in these handicrafts are almost wholly illiterate and do their work according to their primitive methods which are often uneconomical and non-efficient. The lengthy and laborious processes of dyeing by vegetable dyes have now been replaced by short processes of imported synthetic dyes but it is not adequately realised that the new processes of dyeing require high technical skill which the illiterate village dyer lacks. High class dyeing is carried out in dye houses of cotton mills under the supervision of well trained experts, but the large scale processes followed in these dye houses cannot be adopted by cottage dyers and the dyers who work mechanically in such dye houses for a number of years often fail when they settle down as cottage dyers. In spite of a large trade done in dyeing and printing in this Presidency in the cotton mills and in separate dye houses there is not a single school where this trade is systematically taught except at Baroda, where a small dyeing school is attached to the Kala Bhuvan Technical Institute. United Provinces can boast of a large

dyeing and calico printing school at Cawnpore from which the demonstrators for this Department have always been recruited and the Punjab has lately opened a similar school at Lahore on a large scale. A large number of dyers are attracted from the United Provinces to Bombay mills. There is, therefore, a great necessity for opening a well equipped dyeing and calico printing school in Bombay either attached to the Victoria Jubilee Technical Institute or to this Department with two separate courses of training—a diploma course for graduates of science to enable them to serve as dyeing masters and a practical course for dyeing jobbers or maistries.

119. **Dyeing and Calico Printing Demonstration.**—A peripatetic demonstration in these crafts on the most modern and scientific lines is held by this Department with the help of a qualified dyer and printer for the benefit of cottage dyers and printers in their own localities in important centres of this Presidency and they are invited to attend the demonstration of the new methods and learn them. The dyers and printers are allowed to take any samples to the demonstrator in his laboratory and request him to show them the methods of reproducing them and the demonstrator frequently visits the cottages of the dyers and printers to show them the defects of their primitive methods and teach them the new ones on the spot with a practical demonstration all at Government expenses. In this way considerable interest is aroused amongst cottage workers, old prejudices are broken down and new and up-to-date methods of dyeing and printing make slow but sure progress. The following account of the demonstration opened at Sholapur last year will give some idea as to the ignorance of the local dyers and their difficulties the demonstrator had to remove.

120. The demonstration at Sholapur was opened at the request of the Sholapur District Weavers' Central Co-operative Union. Process of dyeing as carried on at Sholapur, before the demonstration was opened, was of a crude and irregular form. The dyers did not know the correct methods of using various dye-stuffs with the result that shades were uneven and fugitive. Silk is dyed at Sholapur by a certain class of people called " khetries ", some of whom are experienced in the art. Sholapur dyers used direct acid and basic dyes, but a large number used cheap fugitive dye-stuffs. Calico printing is not generally done in Sholapur. Cotton yarn is dyed in Sholapur on a large scale specially for *saree* weaving in which there is a very large trade. The dyers of Sholapur were so ignorant that they did not know that it was necessary to boil the yarn prior to dyeing to remove the size. The water used for dyeing was hard in many cases and dyers did not know how to remove the hardness. The dyed yarn was not washed after dyeing which made it tender and weak. Standing baths were not used and the water was thrown away when the dyeing was over, causing some loss of dye-stuff. Drying of the dyed yarn was done in the open sun which faded the colour.

121. The dyers did not know that some care was necessary in storing the dye-stuff when not in use to prevent decomposition, and consequently a large quantity of dyes were wasted by deterioration. The process of developing of the right shade after dyeing was not known by the dyers. There are many brands of sulphur dyes on the market but the special features of some of them and the methods of manipulation were not known to the dyers. Some dyers used cheap direct colours by boiling the yarn in the dye and drying and using it without washing. Some times the dyed yarn was topped with basic colours to make it look bright. The dyers did not know that there were certain brands of superior and fast direct colours. Vat colours were used by some of the Sholapur dyers with very unsatisfactory results as the application and mixing of these colours require special technical skill and experience. Napthols were used by a few dyers for dyeing mercerised yarn but the lustre was not satisfactory as the correct proportion of the napthols was not known to the dyers.

122. The demonstrator had to start his work by visiting dye houses of the cottage dyers. In the beginning the demonstrator found it hard to break down old prejudices and to win over the confidence of the dyers as they usually do not like Government interference in their work. Success in such cases depends upon the personality and tact of the demonstrator who has to move very slowly and cautiously. In the beginning there was a prejudice against using sulphur colours in Sholapur amongst some dyers and they followed their primitive but somewhat costly methods of dyeing. Hydrosulphite process of dyeing was, therefore, introduced and the dyers were convinced of the saving in time, labour and fuel thereby. Some dyers tried alizerine dyes at Sholapur but did not succeed, though at Valsang, only 15 miles from Sholapur, dyers were successful in using alizerine. This was due to the hardness of water at Valsang as hard water is necessary for alizerine dyes, and this was explained to Sholapur dyers. Again Sholapur dyers used to purchase Turkey-red oil ready made. A method of preparing this oil locally was shown to them. Similarly the dyers were using a certain brand of soap for their napthol dyeing which was very costly. A recipe was given them for preparing the soap from castor oil and caustic soda. Improvements in dye vats were also suggested and carried out as the zinc vats used by Sholapur dyers were not suitable for sulphur colours and caused chemical reaction. Treatment before and after dyeing that is absolutely necessary for good results was shown and introduced by explaining the advantages and by these methods the cost of dyeing was greatly reduced and the product much improved to the satisfaction of dyers.

123. As regards silk dyeing which is also carried on to some extent at Sholapur by " khetries ", new processes of removing gum and cereous materials before dyeing and those of weighing and whitening the silk after dyeing were shown and introduced.

124. As the story of the advantages derived from the demonstration at Sholapur went round the dyers of surrounding towns and villages, who often go to Sholapur to buy dye-stuffs and chemicals, began to call and see what was being done and taught in the demonstration laboratory. Many enquirers came from Guledgud, Bijapur, Maindargee, Chadchan, Mohol, Madha,-Barsi, Sangola, Pandharpur, Karam, etc., to all of whom advice and help were given. Dyers from Guledgud and Gadag specially came to learn new processes of silk dyeing. Besides the dyers about a dozen young men attended the demonstration laboratory regularly to learn the principles of dyeing as students. These took down notes and helped the demonstrator in his experiments. A number of new dye houses have been opened at Sholapur with the help of the demonstrator.

125. At the end of February 1926, the demonstration was closed at Sholapur and transferred to Sindh. The demonstrator first opened his laboratory in Karachi in the month of March 1926 and began making enquiries and investigations as regards the dyeing and calico printing trade in Sindh. In Karachi he visited Parsi Girls' Industrial Home, Mayavaunshi Rajput Kumar Vidyalaya and Cutchhi Lohana Orphanage at their requests occasionally and taught elementary dyeing to some inmates of these charitable institutions and the students being literate and energetic took down notes and picked up the work very soon from the practical demonstrations given them.

126. The staff on the whole worked with efficiency. Looking to the amount of work done throughout the year the staff in the Bombay Office was over-worked.

I have the honour to be,
Sir,
Your most obedient servant,

F. E. BHARUCHA,
Director of Industries.

APPENDIX

COMMERCIAL AND INDUSTRIAL ENQUIRIES 1925-26

	Subject of enquiry	Number of enquiries
1.	Acid oleic. Acid stearic—Production and demand for —	1
2.	Agave fibre. Market for —	1
3.	Alfanso Mangoes. Exporters of —	1
4.	Alum. Manufacturers of —	1
5.	Aluminium-Powder. Manufacturers of —	1
6.	Annatto Seeds. Dealers in —	1
7.	Artificial Manures. Dealers in —	1
8.	Asbestos. Exporters of —	1
9.	Ayurvedic Stores. Names of —	1
10.	Bacon and Ham Factories. Addresses of —	1
11.	Bamboo Pulp. Dealers in —	1
12.	Bangles. Dealers in —	1
13.	Bauxite. Exporters of —	1
14.	Benzine. Dealers in —	1
15.	Betelnuts. Imports of —	1
16.	Bidies—Indian. Market for —	1
17.	Bone and Bonemeal. Suppliers of —	1
18.	Bone Mills. Names of —	2
19.	Boots—Army. Manufacturers of —	1
20.	Boots—Shoes. Manufacturers of —	1
21.	Bottles—Glass—for fruit juices. Manufacturers of —	1
22.	Bottles—Glass. Suppliers of —	1
23.	Brandy. Distillers of —	1
24.	Brass, Copper, etc.—Works. Addresses of —	1
25.	Brass and Copper Sheets. Manufacturers of —	1
26.	Brocades. Dealers in —	1
27.	Bulbs—Electric. Repairers of —	1
28.	Button Making Machines. Information *re* —	1
29.	Candle wicks. Manufacturers of —	1
30.	Carbon Papers. Process for Manufacture of —	1
31.	Casein. Dealers in —	1
32.	Cement. Manufacturers of —	1
33.	Cement Factories. Addresses of —	1
34.	Cement—Mill Stone. Uses of —	1
35.	Charcoal. Dealers in —	1
36.	Charcoal. Process for the Manufacture of —	1
37.	Charkas. Dealers in —	1
38.	Charpoy and other tapes. Importers of —	1
39.	Chemicals (heavy) Addresses of Works interested in —	1
40.	Chemical Experts. Names of —	1
41.	Cigar and Cigarettes. Manufacturers of —	1
42.	Cigarette Factory. Estimates for —	1
43.	Cinema films. Manufacturers of —	1

	Subject of enquiry	Number of enquiries
44.	Cocoanuts. Importers of —	1
45.	Colours. Dealers in —	1
46.	Colours. Information *re* : Oil, Mineral & Water —	1
47.	Colour and Sugar Factories. Information *re* —	1
48.	Condensed Milk and Butter. Imports of —	1
49.	Cottage Industries. Literature on —	1
50.	Cottage Industries. Particulars of —	1
51.	Cotton. Dealers in —	1
52.	Cotton Mills. Names of —	2
53.	Drilling Machines. Suppliers of —	1
54.	Drugs. Exporters of—	1
55.	Drugs. Factories, Manufacturing of —	1
56.	Drums and Kegs. Manufacturers of —	1
57.	Dyes. Importers of —	1
58.	Dyes—Napthols. Dealers in —	1
59.	Dyeing by means of Napthols. Information *re* —	1
60.	Dyes. Dealers in—Agents for —	1
61.	Dyes. (Reparation). Dealers in —	2
62.	Dyes. (Reparation). Foreign Suppliers of —	1
63.	Electric Engineering. Facilities for Training in —	2
64.	Electric Installations. Rules and Regulation for —	1
65.	Enamelling Experts. Services of —	1
66.	Enamelled Iron. Manufacturers of —	1
67.	Ethyl Alcohol. Manufacturers of —	1
68.	Factories—Aerated Water. Names of —	1
69.	Factories—Candles. Names of —	1
70.	Factories—Canning. Names of —	1
71.	Factories—Cotton. Names of —	1
72.	Factories—Ginning and Pressing. Names of —	5
73.	Factories—Glass. Names of —	3
74.	Factories—Handloom. Names of —	1
75.	Factories—Oil. Names of —	1
76.	Factories—Powerloom. Names of —	1
77.	Felt bodies. Buyers of —	1
78.	Felt Caps. Manufacturers of —	1
79.	Fibres—Aloe and Agave. Information *re* —	1
80.	Fibres. Experts in —	1
81.	Fibres—Ketki—Quotation for —	1
82.	Fire Works. Importers of —	1
83.	Flour—Wheat. Rates for —	1
84.	Flour Mill accessories. Dealers in —	1
85.	Gas. Analysis of —	1
86.	Gelatin. Particulars *re* : the Manufacture of —	1
87.	Ginning and Pressing Factory—Site for—in Karachi. Information *re* — ..	1
88.	Glass Industry. Particulars *re* —	1
89.	Glass—Window, Sheet and Coloured. Foreign Dealers in —	1

	Subject of enquiry	Number of enquiries
90.	Glazed bricks. Manufacturers of —	1
91.	Glue from hides. Process for manufacture of —	1
92.	Glue Meter. Dealers in —	1
93.	Gold and Silver Leaf. Importers of —	1
94.	Gold and Silver Refiners. Addresses of —	1
95.	Gold Mines. List of — in India —	1
96.	Gold and Silver Thread. Manufacturers of —	1
97.	Graphite, Carixite, etc. Foreign dealers in —	1
98.	Groundnuts. Exporters of —	1
99.	Groundnuts and Karadi. Production of —	1
100.	Handloom Accessories. Dealers in —	1
101.	Hardwares. Dealers in —	1
102.	Hardwares. Imports of —	1
103.	Hemp Seed. Dealers in —	1
104.	Hides—Deliming. Process of —	1
105.	Hosiery. Manufacturers of —	2
106.	Hydrogen Gas. Demand for —	1
107.	Ice Plant. Dealers in —	1
108.	Import duty on looms. Information *re* —	1
109.	Indian Industries—. Information about — required for Trade Directory ..	1
110.	Industrial Concerns. Lists of —	2
111.	Industrial Schools. Addresses of —	1
112.	Iron Moulds. Manufacture of —	1
113.	Jails, Weaving Schools, Weaving Factories. Addresses of — of the Punjab .	1
114.	Jute—Firms interested in—In Persia. Names of —	1
115.	Kat (Rust). Process for removing —	1
116.	Knitted Goods. Ranges and styles of —	1
117.	Knitting Machines. Dealers in —	1
118.	Lac—Synthetic. Information *re* —	1
119.	Lace. Source of Supply and production of —	1
120.	Lamps—Gas. Manufacturers of —	1
121.	Lamps—Metal. Manufacturers of —	1
122.	Lead Ores. Sources of—Dealers in —	1
123.	Leather Tallow. Manufacturers of —	1
124.	Lifeboats. Timber suitable for —	1
125.	Lime. Rates of —	1
126.	Lizard Skin. Suppliers of —	1
127.	Locomotives. Manufacture of —	1
128.	Looms—Power. Dealers in —	2
129.	Machinery—Button Making. Dealers in —	1
130.	Machinery—Button Making. Manufacturers of —	1
131.	Machinery—Candle-wicks. Dealers in —	1
132.	Machinery—Oil Extracting Plant. Particulars of —	1
133.	Machinery—Oil Extracting Plant. Dealers in —	1
134.	Machinery—Flour Mill. Dealers in —	1
135.	Machinery—Oil Mill. Dealers in —	1

	Subject of enquiry	Number of enquiries
136.	Machinery—Soap. Dealers in —	1
137.	Machinery—Sugar (Powder). Manufacturers of —	1
138.	Machinery—Textile. Manufacturers of —	1
139.	Machinery—Thread ball making. Dealers in —	1
140.	Machinery—Tobacco and Cigarettes	1
141.	Machinery—Weaving letters on Cloth. Dealers in —	1
142.	Machine tools. Manufacturers of —	1
143.	Match Factories. Names and addresses of —	7
144.	Mineral Oil. Imports of —	1
145.	Mines—Leases of—Information *re* —	1
146.	Motors and Cycles. Dealers in —	1
147.	Motor Engineering Institutes. Addresses of —	1
148.	Moulds from Saw-dust. Process for making of —	1
149.	Myrabolams. Dealers in —	2
150.	Nail brushes. Manufacturers of —	1
151.	Needle-work requisites. Dealers in —	1
152.	Newspapers. Registration of —	1
153.	Nibs and Pencils—Institutes imparting training in —	1
154.	Nitre. Manufacturers of —	1
155.	Oils. Buyers of —	1
156.	Oil—Eucalyptus. Manufacturers and Dealers in —	1
157.	Oil—Fish. Dealers in —	1
158.	Oil—Fish—Crude. Importers of —	1
159.	Oil—Margosa. Information *re* —	1
160.	Oil—Mineral. Particulars of —	1
161.	Oil—Sandalwood. Manufacturers and Dealers in —	1
162.	Oil—Vegetable. Literature on —	1
163.	Oil Engines. Dealers in —	1
164.	Oil Engines. Particulars of —	1
165.	Oil Industry. Condition and particulars of —	1
166.	Oil Mill. Advice *re* —	1
167.	Oil Mills. Addresses of —	1
168.	Oil Mill—Cotton Seed. Particulars *re*: Cost of —	1
169.	Paddy husking Mill. Information *re* —	1
170.	Paper—Hand-made. Manufacturers of —	1
171.	Paper Pulp. Dealers in —	1
172.	Perfumes, Soap, etc. Process for manufacture of —	1
173.	Petrol. Exports, Consumption, Production of —	1
174.	Piecegoods (Indian). Exports of —	1
175.	Piecegoods. Market for — in the Near East —	1
176.	Pig Iron. Consumption of —	1
177.	Ploughs. Manufacturers and dealers in —	3
178.	Preserved fruits. Importers of —	1
179.	Printing Machines. Imports of —	1
180.	Pumps. Particulars of —	1
181.	Ramie and China grass. Information *re* —	1

	Subject of enquiry	Number of enquiries
182.	Rice boiling. Particulars of —	1
183.	Rice Mills. Names of —	1
184.	Rice Mill Industry. Literature on —	1
185.	Rice Paper. Manufacturers of —	1
186.	Roller Mills. Dealers in —	1
187.	Sabai grass. Percentage of moisture in —	1
188.	Sandalwood. Quotations for —	1
189.	Sealing Wax. Market for raw —	1
190.	Sealing Wax, Manufacturers of —	1
191.	Seeds, drugs and spices. Sources, Supply—Dealers in —	1
192.	Seeds and Oils. Exports—Imports of —	1
193.	Ship builders. Names of —	1
194.	Silk (artificial). Manufacturers of —	1
195.	Silk (artificial). Addresses of Mills using —	1
196.	Silk (artificial). Particulars of —	1
197.	Silk (yarn). Dealers in —	4
198.	Silk (yarn). Importers of —	1
199.	Soap Manufacturers. Names of —	1
200.	Soap Industry. Institutions giving training in —	1
201.	Soap Making. Facilities for training in —	1
202.	Soda (anchor brands). Importers of —	1
203.	Soda Ash. Importers of —	1
204.	Sodium Chlorate. Uses of —	1
205.	Spirit 64° O. P. Suppliers of —	1
206.	Spirit—denatured. Information *re* —	1
207.	State-aid to Industries. Particulars *re* —	1
208.	Stoneware Pipes. Manufacturers of —	1
209.	Sugar Factories. Names of —	1
210.	Sulphate of Ammonia; Foreign dealers in —	1
211.	Sun-flower Seed. Dealers in —	1
212.	Surveying. Institutes giving training in —	1
213.	Tailoring Establishments. Names and addresses of —	1
214.	Takala Seed. Dealers in —	1
215.	Tanneries. Names of —	1
216.	Tanning Bark. Buyers of —	1
217.	Tanning Chrome. Facilities for training in —	1
218.	Tarwad Bark. Suppliers of —	1
219.	Technical and Industrial Institutes. Particulars of —	1
220.	Telegraph Engineering. Institutes imparting instruction in —	1
221.	Tin Boxes. Manufacturers of —	1
222.	Tin Plates. Importers and dealers in —	1
223.	Towels. Manufacturers of—	1
224.	Turpentine. Selling agents for —	1
225.	Varnish, Turpentine, Rosin, etc. Dealers in —	1
226.	Vegetable Ghee. Importers of —	1
227.	Vegetable Tallow. Market for —	1

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	Subject of enquiry	Number of enquiries
228.	Vulcanizers. Dealers in —	1
229.	Warping and Sizing. Information *re* —	4
230.	Waste Paper. Market for —	1
231.	White Lead. Places of occurrence of —	1
232.	White Sand. Occurrence of —	1
233.	Wood for Packing. Sources of —	1
234.	Wood Paints. Information *re* —	1
235.	Wool. Consumers of —	1
236.	Wool (Raw). Dealers in —	1
237.	Wool baling. Particulars *re* —	1
238.	Wool Industry. Particulars of —	1
239.	Wool and Woollen Manufactures. Imports and Exports of —	1
240.	Yarn—Cotton. Dealers in —	2
241.	Yarn—Cotton, Silk and Woollen. Imports of — into the Punjab ..	1
242.	Yarn—Cotton and Silk. Dyers of —	1
243.	Yarn—Cotton. Manufacturers of —	1
244.	Yarn—Mercerised. Dealers in —	3
245.	Yarn Doubling Machine. Dealers in —	1
246.	Yellow Ochre and White Clay. Market for —	1

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